

IN THE CLAIMS:

Please amend the claims as follows:

1. (currently amended) An automatic transmission system comprising:

a first input shaft connected to an internal combustion engine;

a first transmission gear train, gears of said first transmission gear train being each disconnectable, installed on said first input shaft;

a second input shaft;

a second transmission gear train, gears of said second transmission gear train being each disconnectable, installed on said second input shaft;

an output shaft connected commonly to each driven gear train of said first transmission gear train and second transmission gear train;

a motor ~~to apply torque relatively~~ for generating torque, fixedly connected to the first input shaft and the second input shaft via gears, whereby the torque is transferred between said first input shaft and second input shaft; and

a control equipment to control the torque and rotational speed of said motor and connection/disconnection of said first and second transmission gear trains.

2. (withdrawn) An automatic transmission system according to Claim 1, wherein a differential gear is provided between said first input shaft and second input shaft and said motor is connected to said third shaft of said differential gear.

3. (withdrawn) An automatic transmission system according to Claim 1, wherein

a planetary gear is provided;

said ~~first~~ first shaft of said planetary gear is connected to the first input shaft;

said second shaft of said planetary gear is connected to the second input shaft; and

said third shaft of said planetary gear is connected to the motor.

4. (currently amended) An automatic transmission system according to Claim 1, wherein ~~a each~~ gear ratio of each of said second transmission gear train gears is set to a half-position of ~~a the~~ gear ratio of a corresponding one of said first transmission gear train gears.

5. (currently amended) An automatic transmission system according to Claim 1, wherein

a second gear of said ~~second transmission gear~~ gears of said second transmission gear train is connected while the system being driven by a first gear of said ~~first transmission gear~~ gears of said first transmission gear train;

the transmitting torque of said first ~~transmission~~ gear is decreased by increasing said second input shaft torque by the motor;

said first ~~transmission~~ gear is disconnected when the transmitting torque of said first ~~transmission~~ gear becomes nearly zero;

the rotational speed of said first input shaft is set closer to that of a second
~~said third transmission~~ gear of said first transmission gear train, while
maintaining the second input shaft torque by said motor; and

when the rotational speed of the first input shaft has synchronized with
that of its second ~~the third transmission~~ gear, the ~~third transmission gear with~~
the first input shaft is connected to its second gear, ~~and also~~ the generated
torque of the motor is set to zero, and the second ~~transmission gear of said~~
second transmission gear train is disconnected.

6. (canceled)

7. (original) An automatic transmission system according to Claim 1,
wherein

a second gear of said second transmission gear gears of said second
transmission gear train is connected, while being driven by a first gear of said
~~second transmission gear gears~~ of said first transmission gear train;

the transmitting torque of said first ~~transmission~~ gear is decreased by
increasing the second input shaft torque by said motor;

said first ~~transmission~~ gear is disconnected when the transmitting torque
of said first ~~transmission~~ gear becomes nearly zero;

the rotational speed of the first input shaft according to an ~~the~~ automobile
speed to drive an ~~the~~ automobile is continuously varied, while maintaining the
second input shaft torque by said motor; and

when the rotational speed of the first input shaft has synchronized with that of ~~the third transmission~~ a second gear of the first transmission gear train, said ~~third transmission~~ second gear is connected with the first input shaft, and the generated torque of said motor is set to zero, and said second ~~transmission~~ gear of said second transmission gear train is disconnected.

8. (currently amended) An automatic transmission system according to Claim 1, wherein

a second gear of said ~~second transmission gear~~ gears of said second transmission gear train is disconnected while being driven by a first gear of said ~~first transmission gear~~ gears of said first transmission gear train;

the transmitting torque of said first ~~transmission~~ gear is decreased by increasing said second input shaft torque by said motor;

said first ~~transmission~~ gear is disconnected when the transmitting torque of said first ~~transmission~~ gear becomes nearly zero;

the rotational speed of said first input shaft is maintained near the rotational speed of said second ~~transmission~~ gear of said second transmission gear train to drive an ~~the~~ automobile, while maintaining the second input shaft torque by said motor; and,

the rotational speed of the first input shaft is set closer to that of a second ~~the third transmission~~ gear of the first transmission gear train to stop transmission; and

said ~~third transmission~~ second gear of said first transmission gear train

gear is connected with said first input shaft when the rotational speed of the first input shaft has synchronized with that of said second ~~third-transmission~~ gear of the first transmission gear train, and the generated torque of said motor is set to zero and said second ~~transmission~~ gear of the second transmission gear train is disconnected.

9. (withdrawn) An automatic transmission system comprising:
- a first input shaft connected to an internal combustion engine;
 - a first transmission gear train installed on the first input shaft;
 - a first output shaft equipped with a driven gear train that connects with said first transmission gear train;
 - a second input shaft;
 - a second transmission gear train installed on said second input shaft;
 - a second output shaft equipped with a driven gear train that connects with the second transmission gear train,
 - a first final drive gear installed on the first output shaft,
 - a second final drive gear installed on the second output shaft,
 - a final driven gear that commonly engages with said first and second final drive gears,
 - a motor to apply torque relatively between said first input shaft and second input shaft; and
 - a control equipment controlling the torque and rotational speed of said motor and connection/disconnection of said first and second transmission gear

trains.

10. (withdrawn) An automatic transmission system according to Claim 9, wherein the gear ratio of the second final drive gear, which is installed on the second output shaft and engages with said final driven gear, is smaller than that of said first final drive gear.

11. (withdrawn) An automatic transmission system according to Claim 9, wherein

a differential gear is provided between said first input shaft and second input shaft; and

said motor is connected to said third shaft of said differential gear.

12. (withdrawn) An automatic transmission system according to Claim 9, wherein

a planetary gear is provided;

a first shaft of the planetary gear is connected to said first input shaft;

a second shaft of the planetary gear is connected to said second input shaft; and

a third shaft of the planetary gear is connected to said motor.

13. (withdrawn) An automatic transmission system according to Claim 9, wherein each gear ratio of said second transmission gear train is set to a half-

position of the gear ratio of said first transmission gear train.

14. (withdrawn) An automatic transmission system according to Claim 9, wherein

said second transmission gear of said second transmission gear train is connected while the system being driven by said first transmission gear of said first transmission gear train;

the transmitting torque of said first transmission gear is decreased by increasing the second input shaft torque by said motor;

said first transmission gear is disconnected when the transmitting torque of the said transmission gear becomes nearly zero;

the rotational speed of said first input shaft is set closer to that of said third transmission gear of said first transmission gear train, while maintaining the second input shaft torque by said motor; and

when the rotational speed of said first input shaft has synchronized with that of said third transmission gear, said third transmission gear with said first input shaft is connected, and the generated torque of said motor is set to zero and said second transmission gear is disconnected.

15. (withdrawn) An automatic transmission system according to Claim 9, wherein

said second transmission gear of said second transmission gear train is connected, while being driven by said first transmission gear of said first

transmission gear train;

the transmitting torque of the first transmission gear is decreased by increasing the second input shaft torque by said motor;

said first transmission gear is disconnected when the transmitting torque of said first transmission gear becomes nearly zero;

the rotational speed of the first input shaft is set closer to the rotational speed of the third transmission gear of said first transmission gear train, while maintaining the second input shaft torque by the motor; and

when the rotational speed of the first input shaft has synchronized with that of the third transmission gear, said third transmission gear is connected with the first input shaft, and the generated torque of the motor is set to zero and said second transmission gear is disconnected.

16. (withdrawn) An automatic transmission system according to Claim 9, wherein

said second transmission gear of said second transmission gear train is connected, while being driven by said first transmission gear of the first transmission gear train;

the transmitting torque of said first transmission gear is decreased by increasing the second input shaft torque by said motor,

said first transmission gear is disconnected when the transmitting torque of said first transmission gear becomes nearly zero;

the rotational speed of said first input shaft according to the automobile

speed to drive the automobile is varied continuously, while maintaining the second input shaft torque by said motor; and

when the rotational speed of the first input shaft has synchronized with that of the third transmission gear of the first transmission gear train, the third transmission gear with the first input shaft is connected, and the generated torque of the motor is set to zero and said second transmission gear is disconnected.

17. (withdrawn) An automatic transmission system according to Claim 9, wherein

said second transmission gear of the second transmission gear train is connected, while being driven by said first transmission gear of said first transmission gear train;

the transmitting torque of the first transmission gear is decreased by increasing the second input shaft torque by said motor;

said first transmission gear is disconnected when the transmitting torque of said first transmission gear becomes nearly zero;

the rotational speed of said first input shaft maintained near the rotational speed of said second transmission gear of said second transmission gear train to drive the automobile, while maintaining the second input shaft torque by said motor; and,

the rotational speed of the first input shaft is set closer to that of the third transmission gear of the first transmission gear train to stop transmission; and

said third transmission gear is connected with said first input shaft, when the rotational speed of the first input shaft has synchronized with that of the third transmission gear, and the generated torque of the motor is set to zero and said second transmission gear is disconnected.

18. (currently amended) An automobile equipped with an internal combustion engine, automatic transmission, and control equipment that controls the internal combustion engine and automatic transmission; wherein

the automatic transmission comprises:

a first input shaft connected to the internal combustion engine;

a first transmission gear train, of which gears are each disconnectable, installed on the first input shaft,

a second input shaft;

a second transmission gear train, of which gears are each disconnectable, installed on the second input shaft;

an output shaft connected commonly to each driven gear train of the first transmission gear train and second transmission gear train; and

a motor ~~that applies torque relatively~~ for generating torque, fixedly connected to the first input shaft and the second input shaft via gears, whereby the torque is transferred between the first input shaft and second input shaft; and

said control equipment

connects ~~a the second transmission~~ gear of the second transmission gear

train gears to the second input shaft, while the ~~system~~ automobile is being
driven by a the first ~~transmission~~ gear of the first transmission gear train gears;
decreases the transmitting torque of the first ~~transmission~~ gear by
increasing the second input shaft torque by the motor;
disconnects the first ~~transmission~~ gear when the transmitting torque of
the first ~~transmission~~ gear becomes nearly zero;
sets the rotational speed of the first input shaft closer to that of a second
~~the third transmission~~ gear of the first transmission gear train, while
maintaining the second input shaft torque by the motor; and
when the rotational speed of the first input shaft has synchronized with
that of the second ~~third transmission~~ gear of the first transmission gear train,
connects the ~~third transmission~~ second gear of the first transmission gear train
with the first input shaft, ~~and also~~ sets the generated torque of the motor to zero,
and disconnects the second transmission gear.

19. (withdrawn) An automobile equipped with an internal combustion engine, automatic transmission, and control equipment that controls the internal combustion engine and automatic transmission; wherein

the automatic transmission comprises:

a first input shaft connected to the internal combustion engine;

a first transmission gear train installed on said first input shaft;

a first output shaft equipped with a driven gear train that connects with
the first transmission gear train;

a second input shaft,
a second transmission gear train installed on the second input shaft,
a second output shaft equipped with a driven gear train that connects with
the second transmission gear train;

an output shaft equipped with a driven gear train that connects with the
first transmission gear train and second transmission gear train;

a first final drive gear installed on the first output shaft;

a second final drive gear installed on the second output shaft;

a final driven gear that commonly engages with the first and second final
drive gears; and

a motor that applies torque relatively between said first input shaft and
second input shaft; and

said control equipment connects the second transmission gear (or
corresponding second driven gear) of the second transmission gear train, while
the system being driven by the first transmission gear of the first transmission
gear train,

decreases the transmitting torque of the first transmission gear by
increasing the second input shaft torque by the motor,

disconnects the first transmission gear when the transmitting torque of
the first transmission gear becomes nearly zero,

sets the rotational speed of the first input shaft closer to that of the third
transmission gear of the first transmission gear train, while maintaining the
second input shaft torque by the motor, and

when the rotational speed of the first input shaft has synchronized with that of the third transmission gear, connects the third transmission gear with the first input shaft (or the corresponding third driven gear with the first output shaft), and also sets the generated torque of the motor to zero and disconnects the second transmission gear.

20. (currently amended) An automatic transmission system comprising:

- a first input shaft connected to an internal combustion engine;
- a first transmission gear train, gears of said first transmission gear train being each disconnectable, installed on the first input shaft;
- a second input shaft;
- a second transmission gear train, gears of said second transmission gear train being each disconnectable, installed on said second input shaft;
- an output shaft connected commonly to each driven gear train of said first transmission gear train and second transmission gear train;
- a motor ~~to apply torque relatively~~ for generating torque, fixedly connected to the first input shaft and the second input shaft via gears, whereby the torque is transferred between said first input shaft and second input shaft;
- of which system connects ~~the~~ a second ~~transmission~~ gear of the second transmission gear train, while the system being driven by ~~the~~ a first ~~transmission~~ gear of the first transmission gear train;
- decreases the transmitting torque of the first ~~transmission~~ gear by increasing the second input shaft torque by the motor;

disconnects the first ~~transmission~~ gear when the transmitting torque of the first ~~transmission~~ gear becomes nearly zero;

sets the rotational speed of the first input shaft closer to that of ~~the third transmission~~ a second gear of the first transmission gear train, while maintaining the second input shaft torque by the motor, and

when the rotational speed of the first input shaft has synchronized with that of the second ~~third transmission~~ gear of the first transmission gear train, connects the second ~~third transmission~~ gear of the first transmission gear train with the first input shaft, ~~and also~~ sets the generated torque of the motor to zero, and disconnects the second transmission gear.

21. (withdrawn) An automatic transmission system comprising:
- a first input shaft connected to an internal combustion engine;
 - a first transmission gear train installed on said first input shaft;
 - a first output shaft equipped with a driven gear train that connects with said first transmission gear train;
 - a second input shaft;
 - a second transmission gear train installed on said second input shaft;
 - a second output shaft equipped with a driven gear train that connects with the second transmission gear train;
 - an output shaft equipped with a driven gear train that connects with the first transmission gear train and second transmission gear train;
 - a first final drive gear installed on said first output shaft;

a second final drive gear installed on said second output shaft;

a final driven gear that commonly engages with said first and second final drive gears, and

a motor that applies torque relatively between the first input shaft and second input shaft;

of which system connects the second transmission gear (or corresponding second driven gear) of the second transmission gear train, while the system being driven by the first transmission gear of the first transmission gear train,

decreases the transmitting torque of the first transmission gear by increasing the second input shaft torque by the motor,

disconnects the first transmission gear when the transmitting torque of the first transmission gear becomes nearly zero,

sets the rotational speed of the first input shaft closer to that of the third transmission gear of the first transmission gear train, while maintaining the second input shaft torque by the motor, and

when the rotational speed of the first input shaft has synchronized with that of the third transmission gear, connects the third transmission gear with the first input shaft (or the corresponding third driven gear with the first output shaft), and also sets the generated torque of the motor to zero and disconnects the second transmission gear.

22. (new) The automatic transmission system according to claim 1, wherein the gears for transferring the torque from the motor to the first and

second input shafts are bevel gears.

23. (new) The automobile according to claim 18, wherein the gears for transferring the torque from the motor to the first and second input shafts are bevel gears.

24 (new) The automatic transmission system according to claim 20, wherein the gears for transferring the torque from the motor to the first and second input shafts are bevel gears.

25 (new) The automatic transmission system according to claim 1, wherein the first input shaft is directly connected to the internal combustion engine.

26 (new) The automobile according to claim 18, wherein the first input shaft is directly connected to the internal combustion engine.

27 (new) The automatic transmission system according to claim 20, wherein the first input shaft is directly connected to the internal combustion engine.